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| APPLICATION NO.                                                                                       | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-------------------------------------------------------------------------------------------------------|-------------|----------------------|---------------------|------------------|
| 10/560,460                                                                                            | 12/14/2005  | Takeshi Kobayashi    | 2352.011            | 3037             |
| 23405 7590 04/09/2008<br>HESLIN ROTHENBERG FARLEY & MESTI PC<br>5 COLUMBIA CIRCLE<br>ALBANY, NY 12203 |             |                      |                     |                  |
| EXAMINER                                                                                              |             |                      |                     |                  |
| SINCLAIR, DAVID M                                                                                     |             |                      |                     |                  |
| ART UNIT                                                                                              |             | PAPER NUMBER         |                     |                  |
| 2831                                                                                                  |             |                      |                     |                  |
| MAIL DATE                                                                                             |             | DELIVERY MODE        |                     |                  |
| 04/09/2008                                                                                            |             | PAPER                |                     |                  |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

**Application No.**

10/560,460

**Applicant(s)**

KOBAYASHI ET AL.

**Examiner**

DAVID M. SINCLAIR

**Art Unit**

2831

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 14 December 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 10-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 10-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SF/88)  
Paper No(s)/Mail Date 12/14/2005 & 3/30/2006
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 10-13 and 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 3-361563 hereafter referred to as JP563 in view of Takase '876.

In regards to claim 10,

JP563 discloses a separator for an electric double layer capacitor, wherein a layer of an ultrafine fibrous aggregate prepared by an electrostatic spinning process is contained, an average fiber diameter of ultrafine fibers constituting said ultrafine fibrous aggregate layer is 1  $\mu\text{m}$  or less (abstract; page 2 – right column - lines 5-16 and left column – line 5; page 14 right column line 12).

JP563 fails to teach the separator for an electric double layer capacitor, the thickness of the entire separator is 25  $\mu\text{m}$  or less, and a maximum pore size of said ultrafine aggregate is not more than 3 times a mean flow pore size.

Takase '876 teaches a separator wherein the thickness of the entire separator is 25  $\mu\text{m}$  or less ([0057]) and a maximum pore size of said ultrafine aggregate is not more than 3 times a mean flow pore size ([0071]). Takase '876 fails to teach the separator for an electric double layer capacitor.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the thickness and ratio taught by Takase '876 with the separator of JP563 to obtain a separator that is small in size and has a narrow distribution of pore size which allows the electrolyte to be uniformly dispersed thus reducing the internal resistance.

The limitation "for and electric double layer capacitor" is an intended use of the separator, it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations.

Ex parte Masham, 2 USPQ2d 1647 (1987)

In regards to claim 11,

The references as applied above disclose all the limitations of claim 11 except a thickness of the entire separator is 20  $\mu\text{m}$  or less.

Takase '876 teaches a thickness of the entire separator is 20  $\mu\text{m}$  or less ([0057]).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the thickness taught by Takase '876 with the separator of JP563 to obtain a separator that is small in size allowing miniaturization of the device it is used in.

In regards to claim 12,

The references as applied above disclose all the limitations of claim 12 except the mean flow pore size of said ultrafine fibrous aggregate layer is 1  $\mu\text{m}$  or less.

Takase '876 teaches mean flow pore size of said ultrafine fibrous aggregate layer is 1  $\mu\text{m}$  or less ([0091] – maximum pore size is 40  $\mu\text{m}$  or less therefore mean flow pore size is 20  $\mu\text{m}$  or less).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the mean flow pore size taught by Takase '876 with

the separator of JP563 to obtain a separator that allows uniform dispersion of an electrolyte.

In regards to claim 13,

The references as applied above disclose all the limitations of claim 13 except a ratio ( $D_d/D_a$ ) of a standard deviation ( $D_d$ ) of fiber diameters of ultrafine fibers constituting said ultrafine fibrous aggregate layer to an average fiber diameter ( $D_a$ ) of ultrafine fibers constituting said ultrafine fibrous aggregate layer is 0.25 or less.

Takase '876 teaches a ratio ( $D_d/D_a$ ) of a standard deviation ( $D_d$ ) of fiber diameters of ultrafine fibers constituting said ultrafine fibrous aggregate layer to an average fiber diameter ( $D_a$ ) of ultrafine fibers constituting said ultrafine fibrous aggregate layer is 0.25 or less ([0025]).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the ratio taught by Takase '876 with the separator of JP563 to obtain a separator with uniform pore diameter and internal space allowing the electrolyte to be uniformly distributed.

In regards to claim 16,

The references as applied above disclose all the limitations of claim 16 except a porosity of said separator is 50% to 95%.

Takase '867 teaches a porosity of said separator is 50% to 95% ([0072]).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the porosity taught by Takase '876 with the separator of JP563 to obtain a separator with lowered internal resistance and pressure.

In regards to claim 17,

The references as applied above disclose all the limitations of claim 17 except a tensile strength per 1 g/m<sup>2</sup> in mass per unit area is 0.15 N/5 mm width or more in at least one direction of said separator

Takase '867 teaches a tensile strength per 1 g/m<sup>2</sup> in mass per unit area is 0.15 N/5 mm width or more in at least one direction of said separator ([0075]).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the tensile strength taught by Takase '876 with the separator of JP563 to obtain a separator that is less susceptible to breakage.

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4. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP563 and Takase '876 as applied to claim 10 above, and further in view of Thrasher et al. (2003/0086171).

The references as applied above disclose all the limitations of claim 14 except said ultrafine fiber is composed of at least one resin selected from the group consisting of polyacrylonitrile, polyvinylidene fluoride, polyimide, nylon, polystyrene, polyethylene glycol, polyvinyl alcohol, and polyvinyl pyrrolidone.

Thrasher '171 teaches a separator comprising fibers composed of at least one resin selected from the group consisting of polyacrylonitrile, polyvinylidene fluoride, polyimide, nylon, polystyrene, polyethylene glycol, polyvinyl alcohol, and polyvinyl pyrrolidone ([0017]).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use at least one material resin material selected from the group consisting of polyacrylonitrile, polyvinylidene fluoride, polyimide, nylon, polystyrene, polyethylene glycol, polyvinyl alcohol, and polyvinyl pyrrolidone to form the ultrafine fibers, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416. ([0057]).



5. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Watanabe et al. (4,697,224) in view of JP563 and Takase '876.

Watanabe '224 discloses a double layer capacitor comprising a separator (abstract). Watanabe fails to teach the separator according to claim 10.

The combination of claim 10 teaches the separator according to claim 10 (see rejection above).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the separator taught by the combination with the electric double layer capacitor of Watanabe '224 to obtain an electric double layer capacitor comprising a separator having a good electrolyte holding capacity.

6. Claims 10-14 & 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arora et al. (7,112,389) in view of Takase '876.

In regards to claim 10,

Arora '389 discloses a separator (abstract) for an electric double layer capacitor, wherein a thickness of the entire separator is 25  $\mu\text{m}$  or less (column 3 – lines 28-39), a layer of an ultrafine fibrous aggregate prepared by an electrostatic spinning process is contained (column 10 – lines 12-40), an average fiber diameter of ultrafine fibers constituting said ultrafine fibrous aggregate layer is 1

µm or less (column 3 – lines 28-39). Arora '389 fails to teach the separator for an electric double layer capacitor, a maximum pore size of said ultrafine fibrous aggregate is not more than 3 times a mean flow pore size.

Takase '876 teaches a maximum pore size of said ultrafine fibrous aggregate is not more than 3 times a mean flow pore size ([0071]). Takase '876 fails to teach the separator for an electric double layer capacitor.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the ratio taught by Takase '876 with the separator of Arora '389 to obtain a separator with a narrow distribution of pore size which allows the electrolyte to be uniformly dispersed thus reducing the internal resistance.

The limitation "for and electric double layer capacitor" is an intended use of the separator, it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. Ex parte Masham, 2 USPQ2d 1647 (1987)

In regards to claim 11,

The references as applied above disclose all the limitations of claim 11 except a thickness of the entire separator is 20  $\mu\text{m}$  or less. However, Arora '389 further teaches a thickness of the entire separator is 20  $\mu\text{m}$  or less (example 11).

In regards to claim 12,

The references as applied above disclose all the limitations of claim 12 except said mean flow pore size of said ultrafine fibrous aggregate layer is 1  $\mu\text{m}$  or less. However, Arora '389 further teaches said mean flow pore size of said ultrafine fibrous aggregate layer is 1  $\mu\text{m}$  or less (examples 11-13).

In regards to claim 13,

The references as applied above disclose all the limitations of claim 13 except a ratio ( $D_d/D_a$ ) of a standard deviation ( $D_d$ ) of fiber diameters of ultrafine fibers constituting said ultrafine fibrous aggregate layer to an average fiber diameter ( $D_a$ ) of ultrafine fibers constituting said ultrafine fibrous aggregate layer is 0.25 or less.

Takase '876 teaches a ratio ( $D_d/D_a$ ) of a standard deviation ( $D_d$ ) of fiber diameters of ultrafine fibers constituting said ultrafine fibrous aggregate layer to an average fiber diameter ( $D_a$ ) of ultrafine fibers constituting said ultrafine fibrous aggregate layer is 0.25 or less ([0025]).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the ratio taught by Takase '876 with the separator of Arora '389 to obtain a separator with uniform pore diameter and internal space allowing the electrolyte to be uniformly distributed.

In regards to claim 14,

The references as applied above disclose all the limitations of claim 14 except said ultrafine fiber is composed of at least one resin selected from the group consisting of polyacrylonitrile, polyvinylidene fluoride, polyimide, nylon, polystyrene, polyethylene glycol, polyvinyl alcohol, and polyvinyl pyrrolidone. However, Arora '389 further teaches said ultrafine fiber is composed of at least one resin selected from the group consisting of polyacrylonitrile, polyvinylidene fluoride, polyimide, nylon, polystyrene, polyethylene glycol, polyvinyl alcohol, and polyvinyl pyrrolidone (column 4 – line 62 to column 5 – line 6).

In regards to claim 16,

The references as applied above disclose all the limitations of claim 16 except a porosity of said separator is 50% to 95% However, Arora '389 further teaches a porosity of said separator is 50% to 95% (column 3 – lines 28-39).

In regards to claim 17,

The references as applied above disclose all the limitations of claim 17 except a tensile strength per 1 g/m<sup>2</sup> in mass per unit area is 0.15 N/5 mm width or more in at least one direction of said separator

Takase '867 teaches a tensile strength per 1 g/m<sup>2</sup> in mass per unit area is 0.15 N/5 mm width or more in at least one direction of said separator ([0075]).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the tensile strength taught by Takase '876 with the separator of JP563 to obtain a separator that is less susceptible to breakage.

7. Claims 10 & 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP563 in view of Machine translation of JP2003-105660 hereafter referred to as JP660.

In regards to claim 10,

JP563 discloses a separator for an electric double layer capacitor, wherein a layer of an ultrafine fibrous aggregate prepared by an electrostatic spinning process is contained, an average fiber diameter of ultrafine fibers constituting said ultrafine fibrous aggregate layer is 1 μm or less (abstract; page 2 – right column - lines 5-16 and left column – line 5; page 14 right column line 12). JP563 fails to teach the separator for an electric double layer capacitor, the

thickness of the entire separator is 25  $\mu\text{m}$  or less, and a maximum pore size of said ultrafine aggregate is not more than 3 times a mean flow pore size.

JP660 teaches a separator for a capacitor ([claim 8]) wherein the thickness of the entire separator is 25  $\mu\text{m}$  or less (claim 5) and a maximum pore size of said ultrafine aggregate is not more than 3 times a mean flow pore size (table 1). JP660 fails to teach the separator for an electric double layer capacitor.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the thickness and ratio taught by JP 660 with the separator of JP563 to obtain a separator that is small in size and excellent in ion conductivity.

The limitation "for and electric double layer capacitor" is an intended use of the separator, it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. Ex parte Masham, 2 USPQ2d 1647 (1987)

In regards to claim 15,

The references as applied above disclose all the limitations of claim 15 except the separator containing a non-ultrafine fibrous aggregate layer having an

average fiber diameter of not less than 1  $\mu\text{m}$ , in addition to said ultrafine fibrous aggregate layer.

JP 660 teaches the separator containing a non-ultrafine fibrous aggregate layer having an average fiber diameter of not less than 1  $\mu\text{m}$  ([0128] & [0024] – thick fiber), in addition to said ultrafine fibrous aggregate layer (super-thin fiber layer).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the non-ultrafine fiber layer taught by JP 660 with the separator of JP563 to obtain a separator that has improved strength.

### ***Conclusion***

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

"A multi-layered approach for absorptive lass-mat separators" teaches forming a separator of a fine fiber layer and a course fiber layer to improve the strength.

### ***Communication***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DAVID M. SINCLAIR whose telephone number is (571)270-5068. The examiner can normally be reached on Mon - Thurs 6:30-5.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego F. Gutierrez can be reached on (571) 272-2245. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. M. S./  
Examiner, Art Unit 2831

/Eric Thomas/  
Primary Examiner, Art Unit 2831